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(54) Carton filling machine having a station for applying pouring spouts

(57) A carton filling machine includes a station for applying a pouring spout (14) into a preformed hole (4) in the upper region (6) of an open-topped, partly-formed carton, the station comprising a rotatable mandrel (8) provided with at least one, and preferably two, bosses (12) projecting therefrom. The mandrel (8) is indexed such that, during rotation thereof, the following steps are performed:

a) a spout (14) is positioned on the boss (12);

b) the mandrel (8) enters the open top of the stationary carton and aligns the boss (12) and the spout (14) thereon with the hole (4) in the carton;

c) the spout (14) is displaced to extend through the hole (4) in the carton;

d) the inner end of the spout (14) is secured to the inner wall of the upper regions of the carton, and

e) the boss (12) on the mandrel (8) is withdrawn from the secured spout (14).

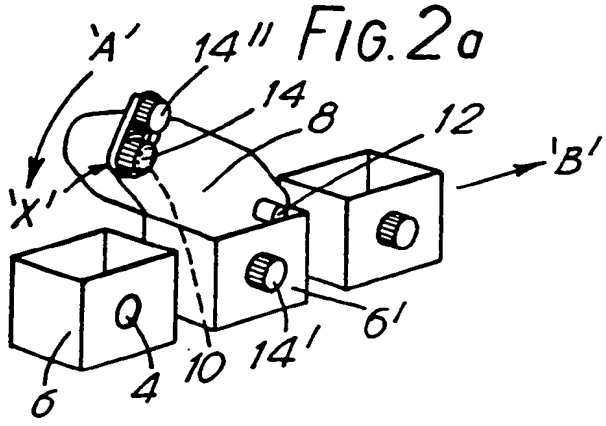

FIG. 2a

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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FIG. 1

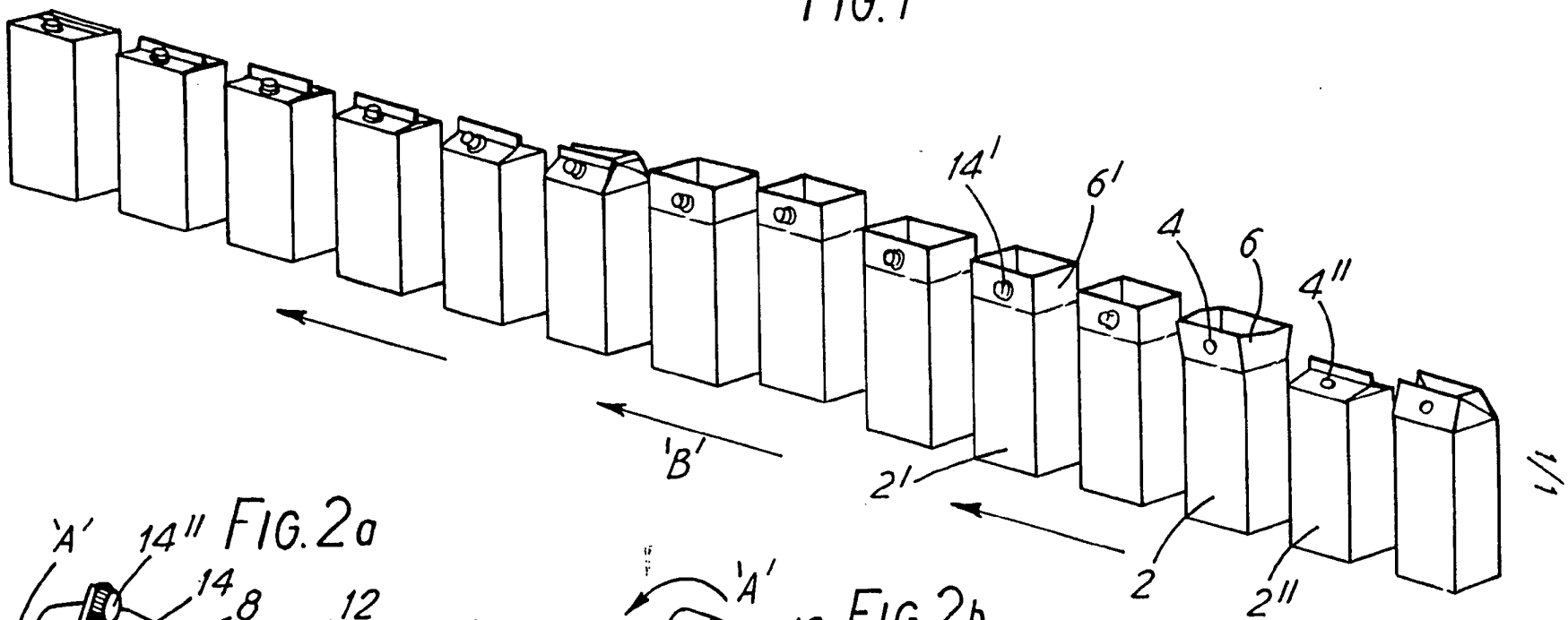


FIG. 2a

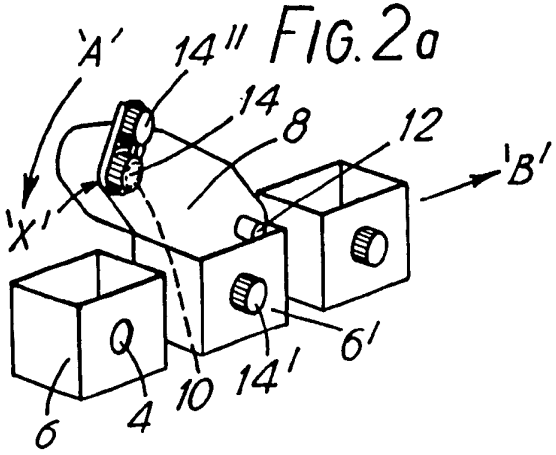


FIG 2b

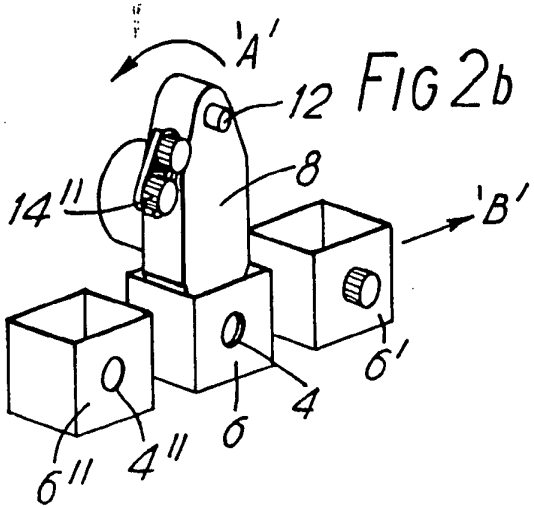
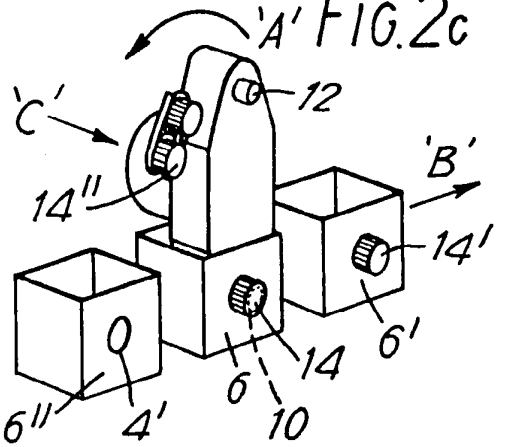


FIG. 2c



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CARTON FILLING MACHINE

This invention relates to carton filling machines and in particular to such machines for producing cartons fitted with pouring spouts thereon.

It is well-established practice to provide carton filling machines which, during the operating cycle, perform, amongst others, the steps of erecting the cartons from preformed blanks, filling the cartons with an appropriate liquid content and sealing the cartons.

However, standard cartons, although of common transverse cross-sectional area, are of different heights depending upon the volume of liquid to be contained therein, while the said contents can be measured under the imperial system eg. 1/2 pint, 1 pint, 2 pints or under the metric system eg. 200 ml, 250 ml, 750 ml, 1 ltr, 1.5 ltr, 2 ltr.

Thus a conventional carton filling machine may have to be adapted to enable it to produce, for example, nine different sized cartons.

The method of opening this type of conventional carton is by breaking the top seal and forming a pouring spout by way of a preformed crease in the carton top. Once this

spout has been formed, it is impossible to reseal the pouring spout to achieve a water tight seal.

Clearly this is an awkward and unsatisfactory way of opening and resealing a liquid container.

It has been proposed to provided cartons of the above type with pouring spouts mounted thereon during the aforementioned assembly of the cartons. However, the established procedures associated with mounting of the spouts in the cartons require a series of steps to be carried out at a series of stations displaced along the length of the machine, which steps include raising the carton during its passage along the machine.

This arrangement thus adds considerably to the number of stations that need to be provided in the machine and therefore to the floor area associated with the machine, as well as to the overall cost of the machine.

It would be desirable to be able to provide a carton filling machine capable of applying pouring spouts to cartons and of a more compact nature than heretofore.

According to the present invention there is provided a carton filling machine including a pouring spout application station for locating a pouring spout in a preformed hole in the upper regions of an open-topped, partly-formed carton, the pouring spout application station comprising a rotatable mandrel provided with at least one boss projecting therefrom, the mandrel being indexed such that, during rotation thereof:

i) a pouring spout is positioned on the boss;

ii) the mandrel enters the open top of the

stationary carton and aligns the boss and pouring spout thereon with the hole in the upper regions thereof;

iii) the pouring spout is displaced to extend through the hole in the upper regions of the carton;

iv) the inner end of the pouring spout is secured to the inner wall of the upper regions of the carton and,

v) the boss on the mandrel is withdrawn from the pouring spout.

Thus it will be appreciated that such an arrangement enables a pouring spout to be inserted into the carton at a single station and without the requirement for moving the partly-formed carton during the insertion of the spout.

In a preferred machine, the or each boss is fixed relative to the mandrel, displacement of the spout into the hole in the upper regions of the carton and subsequent withdrawal of the boss from the spout being achieved by axial displacement of the rotatable mandrel.

Conveniently the pouring spout comprises an annular flange surrounding the inner end thereof and by which the spout is secured to the inner wall of the upper regions of the carton, for example by ultrasonic welding.

Preferably the pouring spout includes an outer cap thereon.

By way of example only, an embodiment of the invention will now be described in greater detail with reference to the accompanying drawings of which:

Fig. 1 shows some of the stations associated with a

carton filling machine according to the invention, and

Figs. 2a, b, and c show the steps associated with the fitting of a pouring spout to a carton at the pouring spout application station of the machine of Fig. 1.

The carton-filling machine of the invention includes a series of stations of conventional construction and operation which form a creased carton blank into an open-topped, partly-formed carton 2 as shown in Fig. 1. The carton 2 differs from the conventional only in that a circular hole 4 is formed in the upper regions 6 of the carton 2, which regions 6 are pre-creased eventually to form the top of the carton.

In Fig. 1, the carton referenced 2 is positioned at the pouring spout application station, while the carton referenced 2' has the spout located thereon.

The application of the spout will be described with reference to Figs. 2a, b and c which shows the upper regions 6 only of the carton 2.

The spout application station includes a mandrel 8 rotatable about a central horizontal axis and provided with a pair of diametrically-opposed bosses 10,12 projecting forwardly therefrom. The mandrel 8 is rotable in an anti-clockwise direction as shown by arrow 'A' in Figs. 2a, b and c, while the cartons 2 are being conveyed through the machine and past the spout application station from left to right as indicated by arrow 'B' in Figs. 2a, b and c.

The pouring spouts are provided with caps already fitted and are indicated at 14, these assemblies being

loaded by hand into a vibratory bowl feeder. From the bowl feeder, the cap/spout assemblies 14 are coveyed via stationary guides to a transfer point 'X' so positioned that, as the mandrel 8 rotates, a boss 10 picks up the lowermost assembly 14 and, using stationary guide rails, that assembly 14 is positioned onto the boss 10 during the indexing period as shown in Fig. 2a.

The carton transfer chain and the spout application station are synchronously indexed such that the rotating mandrel 8 carrying the cap/spout assembly 14 enters the open top of the carton 2 in one continuous movement as shown in Fig. 2b.

In this position of the mandrel 8 and the carton 2, the assembly 14 carried on the boss 10 is aligned with the hole 4 in the upper regions 6 of the carton 2. The transfer chain of the machine is then stopped for a predetermined time during which the mandrel 8 is moved bodily forward to insert the assembly 14 through the hole 4 as indicated by the arrow 'C' in Fig. 2c.

The spout of the assembly 14 is provided with an annular flange or skirt surrounding the inner end thereof and this abuts the inner wall of the upper regions 6 of the carton 2 in the position shown in Fig. 2c. This skirt is then ultrasonically welded to the polymer layer lining the upper region 6 of the carton, the welding step being triggered by a detector mechanism.

The mandrel 8 is then moved rearwardly to disengage the boss 10 from the assembly 14, the transfer chain of the machine and the spout application station being indexed

such that the mandrel 8 is removed from the carton 2 as the transfer chain moves the carton 2 onto its next position.

The transfer point 'X' is constantly supplied with cap/spout assemblies so that, as soon as assembly 14 is removed therefrom by the boss 10, a further assembly 14' enters the point 'X' for collection by the following boss 12.

Furthermore, as the mandrel 8 rotates out of the upper regions 4 of the carton 2, the boss 12 picks up the assembly 14" for location in the upper regions 4" of carton 2".

Once the assembly 14 has been located in a carton, the conventional steps of pre-forming the top, filling the carton and heating the PE coating are carried out as the cartons are indexed through the machine. After sealing of the top, which is carried out with the cap in position, the carton is indexed into the flat top station where the outside layer of PE is heated and then ploughed over and held in the flat position until the PE sets to form a flat top carton.

Thus there is provided a re-sealable water-tight paper container with pouring facilities which may be used for food or non-food purposes, the spout having been applied to the carton at a single station within the machine and without the necessity for movement of the carton other than along its transfer route.

CLAIMS

1. A carton filling machine including a pouring spout application station for locating a pouring spout in a preformed hole in the upper regions of an open-topped, partly-formed carton, the pouring spout application station comprising a rotatable mandrel provided with at least one boss projecting therefrom, the mandrel being indexed such that, during rotation thereof;

i) a pouring spout is positioned on the boss;

ii) the mandrel enters the open top of the stationary carton and aligns the boss and the pouring spout thereon with the hole in the upper regions of the carton;

iii) the pouring spout is displaced to extend through the hole in the upper regions of the carton;

iv) the inner end of the pouring spout is secured to the inner wall of the upper regions of the carton, and

v) the boss on the mandrel is withdrawn from the secured pouring spout.

2. A machine as claimed in claim 1 in which the or each boss is fixed relative to the mandrel, displacement of the spout into the hole in the upper regions of the carton and subsequent withdrawal of the boss from the spout being achieved by axial displacement of the rotatable mandrel.

3. A machine as claimed in claim 1 or claim 2 in which the pouring spout comprises an annular flange surrounding the inner end thereof and by which the spout is secured to the inner wall of the upper regions of the

carton.

4. A machine as claimed in claim 3 in which the annular flange is ultrasonically welded to the inner wall of the upper regions of the carton.

5. A carton filling machine substantially as described with reference to and as illustrated by the accompanying drawings.

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